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ABSTRACT

This study examined how content consideration influenced the instructional strategy decisions reported by novice and experienced teachers. A total of 152 preservice and 153 in-service teachers completed an instrument dealing with well-structured and ill-structured content. The results indicated that both novice and experienced teachers would vary their instructional strategies based on content structure. Their reported variations were similar and consistent with the literature regarding instruction for well-structured and ill-structured content; results raise questions about the tacit knowledge preservice teachers have about instruction, and provide implications for teacher evaluation. Five tables present novice and experienced teacher demographics; instructional functions and related items; reported likelihood of using instructional functions with well- and ill-structured content; and means, standard deviations, and mean differences of the reported likelihood to use various strategies when teaching different types of content. (Contains 26 references.) (Author/AEF)

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Title:

Teacher Decision Making Regarding Content Structure: A Study of Novice and Experienced Teachers

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Abstract

This study examined how content considerations influenced the instructional strategy decisions reported by novice and experienced teachers. A total of 152 preservice and 153 in-service teachers completed an instrument which asked the teachers to indicate the likelihood they would include selected instructional functions in lessons dealing with well-structured and ill-structured content. The results indicated that both novice and experienced teachers would vary their instructional strategies based on content structure. Surprisingly, their reported variations were similar and consistent with the literature regarding instruction for well-structured and ill-structured content. The results raise questions about the tacit knowledge preservice teachers have about instruction. The results also have implications for teacher evaluation.

Teacher Decision Making Regarding Content Structure: A Study of Novice and Experienced Teachers

Teachers are often characterized as decision makers. For example, they decide which topics to teach, how the topics should be sequenced, and which examples to use. These decisions influence instruction and ultimately impact learning outcomes; they are based on information about learners, subject matter, and other pertinent factors (Shavelson & Stern, 1981). Shulman & Grossman (1988) extended the notion of teacher as decision maker by providing a theoretical model of the domains of teachers' professional knowledge, including subject matter knowledge and pedagogical content knowledge (i.e., understanding how to represent specific subject matter topics and issues). Teachers draw from these domains as they plan and implement instruction.

One particularly important decision related to subject matter knowledge and pedagogical content knowledge centers on the extent to which the to-be-learned content is "structured." Rosenshine and Stevens (1986) placed content on a continuum ranging from well-structured to ill-structured. Examples of well-structured content include English grammar and mathematics facts; ill-structured content includes writing poetry and analyzing social issues. Rosenshine and Stevens indicated that instructional strategies should be adjusted based on the extent to which the content is well- (or ill-) structured.

The purpose of this study was to examine how content considerations influence the instructional strategy decisions reported by novice and experienced teachers. Specifically, the study investigated how teachers' instructional strategy decisions reflect the distinction between well- and ill-structured content, and how teaching experience is related to these decisions. It was hypothesized that experienced teachers would be more likely than novice teachers to make appropriate instructional strategy decisions for a given content structure.

Literature Review

The literature on teacher decision making is broad and well developed, especially at the intersection of content structure and instructional planning. The review which follows first examines the role of teacher knowledge in instructional planning. Then the review provides a more detailed look at the literature related to content structure and instructional planning. Finally, attention is given to the issue of how novice and expert teachers approach instructional planning.

Teacher Knowledge and Instructional Planning

As mentioned earlier, teacher decisions are based on the knowledge the teacher uses in the process of planning, conducting, and evaluating instruction.

Thompson (1992) reviewed the literature and noted that studies of the relationship between teachers' beliefs about teaching and instructional practice have yielded inconsistent results. In some cases, (e.g., Shirk, 1973; Grant, 1984) a high degree of agreement was found between teachers' professed views of mathematics teaching and their instructional practice. In other studies (e.g., Brown, 1985; Cooney, 1985), discrepancies between beliefs and practices were found. Thompson concluded that "...any serious attempt to characterize a teacher's conception of the discipline he or she teaches should not be limited to an analysis of the teacher's professed views. It should also include an examination of the instructional setting, the practices characteristic of that teacher, and the relationship between the teacher's professed views and actual practice." (p. 134)

In proposing a model for research on teacher knowledge, Fennema and Franke (1992) argued that teacher knowledge cannot be separated from subject matter, from how that subject matter can be represented for learners, from what we know about students' thinking in specific domains, or from teacher beliefs. Fennema and Franke pointed out that "...within a given context, teachers' knowledge of content interacts with knowledge of pedagogy and students' cognitions and combines with beliefs to create a unique set of knowledge that drives classroom behavior." (p. 162)

In discussing teacher knowledge, Berliner (1986) argued that successful teachers develop expertise in pedagogy and content knowledge, and understand how these two forms of knowledge interact in teaching. In the

context of the current study, this suggests that successful teachers will adapt instructional strategies to match relevant content factors (e.g., degree to which the content is well-structured).

Instruction for Well-Structured Content

Rosenshine (1986a, 1986b) argued that there is ample research to describe a pattern of instruction (referred to as explicit teaching, direct instruction, systematic teaching and/or active teaching) that is useful for teaching any well-structured discipline where the objective is to teach performance skills or mastery of a body of knowledge. This pattern was thought to be most important for young learners, slow learners, and "...for all learners when the material is new, difficult, or hierarchical" (Rosenshine, 1986a, p. 62) and less relevant "... in areas which are 'ill structured,' that is, where the skills to be taught do not follow explicit steps." (Rosenshine, 1986b, p. 6)

In an extensive review of the literature, Rosenshine and Stevens (1986) examined several major studies, for example, the Texas First Grade Reading Group Study (Anderson, Evertson, & Brophy, 1979, 1982) and the Missouri Mathematics Effectiveness Study (Good & Grouws, 1979). Based on these and other studies, Rosenshine and Stevens identified six instructional functions that effective teachers employ. Effective teachers conduct daily reviews and check previous work, present content in an organized manner, guide student practice, provide feedback and correctives, provide opportunities for independent practice, and conduct regular reviews. However, Rosenshine and Stevens cautioned that these instructional functions were most appropriate when teaching well-structured content.

Content Structure Issues

Content structure is based on notions of how and if to-be-learned-content is organized. For example, Posner and Strike (1976) identified five general approaches for organizing course content: world-related sequence, inquiry-related sequence, learning-related sequence, concept-related sequence, and utilization-related sequence. Posner and Strike indicated that these five sequences were "well grounded in what have proven to be useful distinctions in epistemology." (p. 667)

In another attempt to describe content organization, Reigeluth and associates (Reigeluth, Merrill, & Wilson, 1979; Reigeluth, Merrill, Wilson, & Spiller, 1978) identified three content structures - conceptual, theoretical, and procedural. Reigeluth (1987) argued that "...in all the work that has been done on sequencing, elaborations based on concepts, principles, and procedures are the only three we have found, although additional ones may be identified in the future." (p. 249) The underlying assumption in these and other organizing approaches is that to-be-learned content is sufficiently well-structured to allow for organization to occur. However, some would argue the point that all content is well-structured.

In a critical review of Reigeluth's work, Wilson and Cole (1992) take issue with the notion that content can (and should) be characterized within the confines of any one knowledge structure. Citing numerous sources, Wilson and Cole concluded "...there is no single right way to represent knowledge, even for a given context or instructional purpose." (p. 68) They go on to argue that "...a single representation of structure could possibly limit students' personal constructions of meaning from the content." (p. 69) While Wilson and Cole are focusing on Reigeluth's work, they are simultaneously raising questions about the utility of an instructional approach which presupposes the existence of well-structured content.

Assuming that some to-be-learned content is well-structured and other is ill-structured and that this distinction has implications for selecting instructional strategies, the discussion now turns to a brief review of the teacher decision making literature in the context of expert and novice teachers.

Expert/Novice Teacher Decisions

Considerable research has been conducted examining the differences between expert and novice teachers in terms of their decision making. Westerman (1991) conducted a study comparing the thinking of expert and novice teachers during three stages of decision making: planning, teaching, and reflecting. Westerman concluded that novice teachers tend to develop lesson plans in which content knowledge and theoretical knowledge of teaching are minor influences.

Westerman's conclusion was consistent with Borko and Livingston (1989) who examined the planning, teaching, and reflections of student teachers and their cooperating teachers and found differences between the two groups. Specifically Borko and Livingston found that expert teachers displayed more pedagogical knowledge, content knowledge, and pedagogical content knowledge than did novices. Similarly, Brown and Borko (1992) reviewed the literature on expert and novice teachers and concluded that expert teachers typically display more pedagogical content knowledge than do novices.

Literature Summary

In summary, the literature generally supports the notion that content can be thought of along a continuum ranging from well-structured to ill-structured and that instructional decisions should, in part, be based on the extent to which the content is well-structured. Furthermore, the literature suggests that experienced teachers will be more likely to make instructional planning decisions based on this consideration than will novice teachers.

The research described below examines experienced and novice teachers' instructional planning decisions in the context of well- and ill-structured content.

Method

Subjects

As detailed in Tables 1 and 2 below, a total of 152 preservice (i.e., novice) and 153 in-service (i.e., experienced) teachers participated in the study.

Table 1. - Novice teacher demographics

Variable	N	%
Major		
Early Childhood	21	13.8%
Elementary	71	46.7%
Secondary	54	35.6%
Other	6	3.9%
Total	152	100%

Table 2. - Experienced teacher demographics.

	Years Teaching Experience						
	0-5	6-10	11-15	16-20	21-25	26+	Total
Early Childhood	7	2	0	0	0	0	9
Elementary	23	13	10	7	3	0	56
Junior High	14	7	3	7	4	0	35
Secondary	13	10	4	6	3	1	37
Post Secondary	6	1	2	2	3	1	15
Other	1	0	0	0	0	0	1
Total	64	33	19	22	13	2	153

Instrument

Based on Rosenshine and Steven's (1986) work, a survey was constructed to assess the likelihood that novice and experienced teachers would include selected instructional functions in lessons dealing with well-structured and ill-structured content. The survey included a brief introduction with explanations and examples of well-structured and ill-structured content. The survey consisted of nineteen instructional strategies. Participants responded to each strategy in terms of how likely it was for that strategy to be included in a lesson on well-structured content and then in a lesson on ill-structured content. A five point Likert-type scale was used with a response of "4" indicating "Always" and a response of "0" indicating "Never." The nineteen items were organized into one of the six instructional functions identified by Rosenshine and Stevens (see Table 3). Demographic data were also collected on the survey.

Table 3. - Instructional function clusters and related items (Rosenshine & Stevens, 1986).

Instructional Function/Items
I. Daily review and checking previous work
1. Check homework
2. Review relevant past learning
3. Review prerequisite skills
II. Present new content/skills
4. Provide statement of objectives
5. Proceed in small steps but at a rapid pace
6. Provide illustrations and examples
III Guided student practice
7. Initial student practice takes place with teacher guidance
8. Initial practice is sufficient so that students can work independently
9. Prompts are provided during guided practice
10. Guided practice is continued until a success rate of 80% is achieved
IV Feedback and correctives
11. Quick correct responses are followed by another question
12. Slow correct responses are followed by helpful feedback (Right because...)
13. Students are monitored for systematic errors
V. Independent student practice
14. Independent practice to over-learning (responses are firm and quick)
15. Independent practice until 95% correct rate is achieved
16. Students help accountable for seatwork
VI Weekly and monthly reviews
17. Systematic review of previously learned material
18. Frequent tests
19. Reteaching of material missed in tests

Procedure

Data collection was accomplished in two ways. Novice teachers completed the survey while enrolled in an undergraduate teacher education course. Experienced teachers were surveyed by graduate students as a part of a research methods course activity. No attempt was made to randomize or stratify either the novice or experienced teacher groups participating in the study.

Participants were told that the survey was part of a lesson planning study and that their responses would be anonymous. Most participants completed the survey in less than ten minutes. Data from the completed surveys were entered into a SPSS-X database and analyzed.

Means and standard deviations were computed for each cluster by groups (novice/experienced) and by content structure (ill/well). T-tests were calculated on the mean differences between scores for well- and ill-structured content, and between scores for novice and experienced teachers. The results of this analysis are summarized and discussed below.

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Results

As shown in Table 5, novice teachers' means for lessons on well-structured and ill-structured content ranged from a low of 2.40 (Independent Practice for ill-structured content) to a high of 3.33 (Daily Review & Check Homework for well-structured content). For experienced teachers, the means ranged from a low of 1.99 (Weekly & Monthly Review for ill-structured content) to a high of 3.20 (Daily Review & Check Homework for well-structured content). Interestingly, novice teachers' scores were always higher than experienced teachers' scores regardless of instructional function or content structure. Data analysis (t-test) indicated significant differences ($p<.001$) in the likelihood that a specific instructional function would be used for teaching well- verses ill-structured content. This difference was found for novice and experienced teachers.

Table 5. - Reported likelihood of using instructional functions with well- and ill-structured content. (4 = Always, 0 = Never)

	Novice Teachers					Experienced Teachers				
	Well-Structured		Ill-Structured			Well-Structured		Ill-Structured		
	M	(SD)	M	(SD)	Mean Difference	M	(SD)	M	(SD)	Mean Difference
Daily Review & Check Homework	3.33	(.54)	2.59	(.85)	.74*	3.20	(.57)	2.54	(.72)	.66*
Presentation	3.23	(.50)	2.66	(.75)	.57*	3.12	(.53)	2.60	(.77)	.52*
Guided Practice	3.00	(.54)	2.62	(.73)	.38*	2.95	(.57)	2.41	(.79)	.54*
Correctives & Feedback	3.09	(.55)	2.47	(.86)	.62*	2.82	(.56)	2.28	(.77)	.54*
Independent Practice (Seatwork)	2.83	(.63)	2.40	(.80)	.43*	2.54	(.68)	1.97	(.74)	.57*
Weekly & Monthly Reviews	3.19	(.55)	2.41	(.83)	.78*	2.73	(.75)	1.99	(.90)	.74*

*$p < .001$

Somewhat surprisingly, there was no significant difference between novice and experienced teachers in terms of their reported likelihood of using different instructional strategies based on content structure (see Table 6). Ranging from .04 to .16, none of the mean differences between experienced and novice teachers approached statistical significance. Put another way, both novice and experienced teachers indicated they would vary their instructional strategies based on content structure considerations, and their reported variations were similar.

Table 6. - Means, standard deviations and mean differences of reported likelihood to use various instructional strategies when teaching different types of content. (4 = Always, 0 = Never)

	Novice Teachers		Experienced Teachers		Mean Difference Between Novice & Experienced
	Difference Between Well-Structured & Ill-Structured		Difference Between Well-Structured & Ill-Structured		
	M	(SD)	M	(SD)	
Daily Review & Check Homework	.74	(.88)	.66	(.75)	.08
Presentation	.57	(.87)	.52	(.75)	.05
Guided Practice	.38	(.85)	.54	(.74)	.16
Correctives & Feedback	.62	(.96)	.54	(.80)	.08
Independent Practice (Seatwork)	.43	(.90)	.57	(.79)	.14
Weekly & Monthly Reviews	.78	(1.02)	.74	(.89)	.04

*p<.05

Discussion

In this study, both novice and experienced teachers indicated they would vary instructional strategies based on content structure. Furthermore, the variations reported by novice teachers were similar to those reported by experienced teachers. These results have implications for teacher preparation in the context of teacher knowledge and practice. The results also have implications for teacher evaluation. The discussion which follows examines these issues.

Teacher Knowledge and Practice

As discussed earlier in the literature review, Berliner (1986) argued that successful teachers develop expertise in pedagogy, content knowledge, and their interaction as they amass a large quantity of knowledge through teaching experience. Furthermore, Westerman (1991), Borko and Livingston (1989), and Brown and Borko (1992) pointed out that experienced teachers tend to display greater pedagogical content knowledge which is superior to that of novice teachers. Surprisingly, in the current study, novice teachers displayed a knowledge of the interaction of pedagogy and content structure in the absence of extensive teaching experience. One might wonder then, how was this knowledge obtained?

In a study of over 400 preservice teachers Serow, Eaker, & Forrest (1994) found that preservice teachers' orientations to teaching "seemed largely independent of their exposure to teacher-education curricula"....and "were typically grounded in personal experience rather than pedagogical theory or research." (p. 46) Serow, et al, indicated that preservice teachers' personal experience has been derived, in part, from years of observing their own teachers' pedagogical practices suggesting that "...few other fields provide potential recruits with such close-up, sustained exposure to their work." (p.43) In the current study, the novice teachers were likely making instructional strategy decisions based on years of observing their own teachers, rather than on knowledge and skills developed through their teacher preparation program (as borne out by the fact that no decision-making differences could be attributed to years in the teacher preparation program).

Teacher Evaluation

While somewhat tangential, the basis for this study (specifically Rosenshine & Stevens, 1986) and the study findings have implications for teacher evaluation. Many teacher evaluation instruments currently in use are based on one model of effective instruction and do not reflect the need for variations in instructional

functions based on content structure. For example, the Texas Teacher Appraisal System (TTAS) was designed with "efforts to build a practical, usable system that can be applied fairly to teachers in all subjects and grade levels" (p. 6, TTAS Appraiser/Teacher Manual, Texas Education Agency, Austin, TX). However, Lasater and Hawkins (1993-4) reported three studies which focused on art teachers' and art teacher evaluators' perceptions of the appropriateness of the TTAS for use in the art classroom. The majority of teachers questioned the validity of the TTAS for evaluating art teachers. Lasater and Hawkins found similar views among special education teachers who reported a need for content-sensitive evaluation instruments. The argument here is that instruments lacking this sensitivity not only are incomplete, they have the potential of discounting "correct" decision making practices. According to the current study, both experienced and novice teachers are likely to vary their instructional strategies based on content considerations (i.e., well/ill-structured). Consequently, a teacher who is teaching ill-structured content and using appropriate strategies may receive a less favorable evaluation than would a teacher who is using inappropriate strategies if the evaluation instrument does not reflect the distinction based on content structure.

Recommendations and Conclusion

The findings of this study are inconsistent with much of the literature on teacher decision making, especially as it related to novice and experienced teachers. Several additional studies will help resolve the inconsistencies. First, the current study did not include asking the subjects how they made their decisions. For example, if a subject indicated that a review of prerequisite skills was more likely to be included in a lesson on well-structured content that in one on ill-structured content, the rationale underlying the decision is unknown. Was the decision based on knowledge of content and pedagogy, or was it based on other considerations (e.g., the time required to review prerequisite skills)? It is conceivable that a novice teacher's rationale is considerably different from that of an experienced teacher, a distinction consistent with the novice/expert literature.

Second, in the current study, the subjects were given several examples of well- and ill-structured content and asked to indicate how likely it was for selected strategies to be included in an unspecified lesson on each type of content. Consequently, it is unknown if similar decisions would be made if the list of strategies was not provided, a condition more akin to teachers' daily practices. Future studies might provide two sets of outcomes, one based on well-structured content and one based on ill-structured content, but not provide a list of strategies. Here, novice and experienced subjects would be asked to describe how they would teach for each set of outcomes, the intent being to minimize the prompting provided by the list of strategies. Their responses could then be analyzed using the Rosenshine and Stevens (1986) framework as a guide.

Finally, direct observation of instruction by novice and experienced teachers may help close the gap between the current study and the literature. Such a study might begin with a survey of the subjects (either closed-ended as in the current study or open-ended as suggested above). Following the survey, the study would extend into the classroom where teacher decisions are enacted. Lessons on well- and ill-structured content could be observed and the teachers interviewed following the lessons. The interview could focus on key events during the lessons and the teachers' decision making associated with the events. These data could then be analyzed using the Rosenshine and Stevens (1986) framework as a guide.

In conclusion, while the research outlined above will address the gap between the current study and the literature, one over-arching question cannot be ignored. Are novice teachers able to make more sophisticated decisions than they are given credit for in teacher education programs? If that is the case, then perhaps teacher education programs can concentrate more on helping novice teachers implement these decisions and less on building the knowledge base underlying these decisions.

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